IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:	)	
	)	
Heikki SAHA	)	Confirmation No.: 6390
	)	
Application No.: 10/824,606	)	Group Art Unit: 3721
	)	
Filed: April 15, 2004	)	Examiner: T. Truong
	)	
For: ROCK DRILLING RIG AND ROCK BREAKING MACHINE	)	

Commissioner for Patents
United States Patent and Trademark Office
Customer Window, Mail Stop Appeal Brief-Patents
Alexandria, VA 22314
Sir:

APPELLANT'S BRIEF UNDER 37 C.F.R. § 41.37 TRANSMITTAL FORM

1. Transmitted herewith is an Appellant's Brief under 37 C.F.R. § 41.37, which is being submitted further to the Notice of Appeal filed on October 31, 2006.

2. Additional papers enclosed:

- ☐ Drawings: _____ sheets with _____ figures
- ☐ Information Disclosure Statement
- ☐ Form PTO-1449
- ☐ Citations
- ☐ Declaration of Biological Deposit
- ☐ Submission of "Sequence Listing", computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence.

3. Extension of Time

The proceedings herein are for a patent application and the provisions of 37 C.F.R. § 1.136(a) apply.

☐ Appellant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that Appellant has inadvertently overlooked the need for a petition and fee for extension of time.

☒ Appellant petitions for an extension of time, the fees for which are set out in 37 C.F.R. § 1.17(a), for the total number of months checked below:

Total Months Requested	Fee for Extension	[Fee for Small Entity]
☒ one month	$ 120.00	$ 60.00
☐ two months	$ 450.00	$ 225.00
☐ three months	$ 1,020.00	$ 510.00
☐ four months	$ 1,590.00	$ 795.00

Extension of time fee due with this request: $120.00

If an additional extension of time is required, please consider this a Petition therefor.

☐ An extension for _____ months has already been secured and the fee paid therefor of _____ is deducted from the total fee due for the total months of extension now requested.

4. Constructive Petition

☒ **EXCEPT** for issue fees payable under 37 C.F.R. § 1.18, the Commissioner is hereby authorized by this paper to charge any additional fees during the entire pendency of this application including fees due under 37 C.F.R. §§ 1.16 and 1.17 which may be required, including any required extension of time fees, or credit any overpayment to Deposit Account 50-0573. This paragraph is intended to be a **CONSTRUCTIVE PETITION FOR EXTENSION OF TIME** in accordance with 37 C.F.R. § 1.136(a)(3).

5. Fee Calculation

☒ The fee of $500 under 37 C.F.R. § 41.20(b)(2) for filing a brief in support of an appeal is enclosed.

6. Fee Payment

☐ No fee is to be paid at this time.

☒ Enclosed is a check in the amount of $620.00, representing $500.00 for the appeal brief fee and $120.00 for the one-month extension of time fee.

☐ The Commissioner is hereby authorized to charge _____ to Deposit Account No. 50-0573 for the _____ fee.

☒ The Commissioner is hereby authorized to charge any additional fees which may be required, including fees due under 37 C.F.R. §§ 1.16 and 1.17, or credit any overpayment to Deposit Account 50-0573.

Respectfully submitted,

DRINKER, BIDDLE & REATH LLP

Dated: January 30, 2007 By: _____

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PATENT
ATTORNEY DOCKET: 47121-0097

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Sir:

APPELLANT'S BRIEF UNDER 37 C.F.R. § 41.37

This brief is in furtherance of the Notice of Appeal, which was filed in the above-identified patent application on October 31, 2006. The period for filing this brief extends through January 31, 2007 by a one-month extension of time petitioned for herein.

1. The Real Party in Interest

The real party in interest in this appeal is Sandvik Tamrock OY of Tampere, Finland.

2. Related Appeals and Interferences

Appellant is not aware of any other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in the appeal.

3. Status of Claims in Application

The status of the claims is as follows:

Claims canceled: none.

Claims pending: 1-10.

Claims allowed: none.

Claims rejected: 1-10.

The claims on appeal are 1-10.

4. Status of Amendments

Appellant filed an Amendment under 37 C.F.R. § 1.116 on December 20, 2006 in response to the Final Office Action dated August 1, 2006. The Amendment was entered as indicated in the Advisory Action dated January 24, 2007.

5. Summary of Claimed Subject Matter

Referring to Figs. 1-3 of Appellant's specification, Appellant's invention relates generally to a rock drilling rig including a carrier 1, a feeding beam 3, a rock drilling apparatus 4 movable in relation to the feeding beam, one or more sensors 11, 12 arranged to the rock drilling apparatus 4 to measure the operation of the rock drilling apparatus 4, and a first control unit 8 arranged on the carrier 1 of the rock drilling rig to control the operation of the rock drilling apparatus 4 on the basis of measuring information received from the sensors 11, 12. Appellant's invention includes a second control unit 9 arranged to the rock drilling apparatus 4. The second control unit 9 includes a memory unit 9a for storing basic settings for the rock drilling apparatus

4 and a processing unit 9b for calculating parameters describing the operating state of the rock drilling apparatus 4 on the basis of the basic settings and measuring information.

As described at paragraphs 0016-0017, and illustrated in Fig. 3 of Appellant's specification, the second control unit 9 may be arranged inside a body 4a of the rock drilling apparatus 4, where it is protected from the ambient conditions and dents. The individual basic settings of each drilling apparatus type can be stored in the memory unit 9a. The basic settings depend on the construction and size category of the drilling apparatus 4. The basic settings include information on the impact pressure used in the drilling apparatus 4, volume flow of the rotating device 7, volume flow of flushing, feeding pressure, etc. The processing unit 9b may include a computer, programmable logic, or the like able to process the entered information. Further, the one or more sensors 11, 12 may be integrated to the second control unit 9. For example, sensor 11 is arranged to monitor the operation of the percussion device 5, and sensor 12 is arranged to monitor the operation of the rotating device 7. Further, measuring information may be transmitted to the second control unit 9 from a sensor 15 that is arranged to monitor the feeding of flushing medium.

As described at paragraphs 0018-0019, control commands and a drilling plan may be entered into the first control unit 8 via a user interface such as controller 16. The first control unit 8 informs the second control unit 9 how the rock drilling apparatus 4 should operate, based on the drilling plan and control commands. After the basic settings of the drilling apparatus 4 and the prevailing situation, *i.e.* operating state, have been taken into consideration, the second control unit 9 informs the first control unit 8 what external resources it needs to perform the required operation. In this regard, the processing unit 9b of the second control unit 9 forms

parameters that are transmitted to the first control unit 8, where the parameters are compared with the instructions entered into the first control unit 8. On the basis of the comparison, the first control unit 8 adjusts actuators affecting the operation of the drilling apparatus 4. For example, as illustrated in Fig. 3, the first control unit 8 adjusts a first valve 19 that is arranged in a pressure medium channel 21 leading to the percussion device 5. Further, the first control unit 8 adjusts a second valve 30 that is arranged in a pressure medium channel 22 leading to the rotating device 7. A third valve 25 arranged in a channel 24 leading to a feeding cylinder 25 and a fourth valve 27 arranged in a flushing medium channel 26 are adjusted correspondingly. Further, pumps 28 and 29 can also be adjusted. By adjusting the percussion device, rotating device, the feeding and flushing of the drill, for instance, the drilling apparatus may be directed to operate exactly in the desired manner.

As described at paragraph 0007 of Appellant's specification, because the prevailing operating state of the drilling apparatus 4 is defined in the drilling apparatus 4, the control unit 8 arranged on the carrier 1 can be a relatively simple one. Because the equipment for defining the operating state of an individual drilling apparatus 4, *i.e.* the sensors and second control unit 9, is arranged to the drilling apparatus, the replacement of the entire drilling apparatus 4 or a later modification of the original drilling apparatus is simple and does not cause difficult changes to the control system in the rock drilling rig.

Independent Claim 1

With respect to claim 1, as described beginning at paragraphs 0013-0019, and illustrated in Figs. 1-3, an exemplary rock drilling rig includes a carrier 1, at least one feeding beam 3, a

rock drilling apparatus 4 movable in relation to the feeding beam 3 and having a percussion device 5, one or more sensors 11, 12 arranged to the rock drilling apparatus 4 to measure the operation of the rock drilling apparatus 4, at least one first control unit 8 arranged on the carrier 1 of the rock drilling rig to control the operation of the rock drilling apparatus 4 on the basis of measuring information received from the sensors 11, 12, a second control unit 9 arranged to the rock drilling apparatus 4, and a data communications link 10 between the first control unit 8 and the second control unit 9 for transmitting information between the control units 8, 9. The sensors 11, 12 monitor the operation of the rock drilling apparatus 4 and are connected to transmit measuring information to the second control unit 9. The second control unit 9 includes a memory unit 9a for storing basic settings for the rock drilling apparatus 4 and a processing unit 9b for calculating parameters describing the operating state of the rock drilling apparatus 4 on the basis of the basic settings and measuring information, whereby the prevailing operating state of the drilling apparatus 4 is defined in the drilling apparatus 4. The first control unit 8 is arranged to control the operation of the rock drilling apparatus 4 on the basis of the parameters received from the second control unit 9 and instructions given to the first control unit 8.

Independent Claim 4

With respect to claim 4, as described beginning at paragraphs 0013-0019, and illustrated in Figs. 1-3, an exemplary rock breaking machine 4 includes a body 4a, a percussion device 5 arranged inside the body 4a to generate impact pulses to a tool 6 connectable to the rock breaking machine 4, one or more sensors 11, 12 arranged to measure the operation of the rock breaking machine 4, and a control unit 9. The sensors 11, 12 are arranged to transmit measuring

information to the control unit 9. The control unit 9 includes a memory unit 9a for storing basic settings for the rock breaking machine 4 and further a processing unit 9b that is, during operation, arranged to form parameters describing the operating state of the rock breaking machine 4 on the basis of the basic settings and measuring information. The control unit 9 includes a connection to a data communications link 10 that enables communication between the control unit 9 and at least one control unit 8 external to the rock breaking machine 4 for controlling the operation of the rock breaking machine 4 so as to achieve the desired operating state of the rock breaking machine 4.

Independent Claim 6

With respect to claim 6, as described beginning at paragraphs 0013-0019, and illustrated in Figs. 1-3, an exemplary rock breaking machine 4 includes a body 4a, a percussion device 5 arranged inside the body 4a to generate impact pulses to a tool 6 connectable to the rock breaking machine 4, one or more sensors 11, 12 arranged to measure the operation of the rock breaking machine 4, and a control unit 9 arranged inside the body 4a of the rock breaking machine 4. The sensors 11, 12 are arranged to transmit measuring information to the control unit 9. The control unit 9 includes a memory unit 9a for storing basic settings for the rock breaking machine 4 and further a processing unit 9b that is, during operation, arranged to form parameters describing the operating state of the rock breaking machine 4 on the basis of the basic settings and measuring information. The control unit 9 includes a connection to a data communications link 10 that enables communication between the control unit 9 and at least one control unit 8

external to the rock breaking machine 4 for controlling the operation of the rock breaking machine 4 so as to achieve the desired operating state of the rock breaking machine 4.

Independent Claim 7

With respect to claim 7, as described beginning at paragraphs 0013-0019, and illustrated in Figs. 1-3, an exemplary rock drilling apparatus 4 is arranged movable in relation to a feeding beam 3 and includes a body 4a, a percussion device 5 arranged inside the body 4a to generate impact pulses to a tool 6 connectable to the rock drilling apparatus 4, one or more sensors 11, 12 arranged to measure the operation of the rock drilling apparatus 4, and a control unit 9. The sensors 11, 12 are arranged to transmit measuring information to the control unit 9. The control unit 9 includes a memory unit 9a for storing basic settings for the rock drilling apparatus 4 and further a processing unit 9b that is, during operation, arranged to form parameters describing the operating state of the rock drilling apparatus 4 on the basis of the basic settings and measuring information. The control unit 9 includes a connection to a data communications link 10 that enables communication between the control unit 9 and at least one control unit 8 external to the rock drilling apparatus 4 for controlling the operation of the rock drilling apparatus 4 so as to achieve the desired operating state of the rock drilling apparatus 4.

Independent Claim 8

With respect to claim 8, as described beginning at paragraphs 0013-0019, and illustrated in Figs. 1-3, an exemplary rock breaking hammer 4 includes a body 4a, a percussion device 5 arranged inside the body 4a to generate impact pulses to a tool 6 connectable to the rock

breaking hammer 4, one or more sensors 11, 12 arranged to measure the operation of the rock breaking hammer 4, and a control unit 9. The sensors 11, 12 are arranged to transmit measuring information to the control unit 9. The control unit 9 comprises a memory unit 9a for storing basic settings for the rock breaking hammer 4 and further a processing unit 9b that is, during operation, arranged to form parameters describing the operating state of the rock breaking hammer 4 on the basis of the basic settings and measuring information. The control unit 9 comprises a connection to a data communications link 10 that enables communication between the control unit 9 and at least one control unit 8 external to the rock breaking hammer 4 for controlling the operation of the rock breaking hammer 4 so as to achieve the desired operating state of the rock breaking hammer 4.

Independent Claim 9

With respect to claim 9, as described beginning at paragraphs 0013-0019, and illustrated in Figs. 1-3, an exemplary rock drilling rig includes a carrier 1, at least one feeding beam 3, a rock drilling apparatus 4 movable in relation to the feeding beam 3 and having a percussion device 5, one or more sensors 11, 12 arranged to the rock drilling apparatus 4 to measure the operation of the rock drilling apparatus 4, at least one first control unit 8 arranged on the carrier 1 of the rock drilling rig to control the operation of the rock drilling apparatus 4 on the basis of measuring information received from the sensors 11, 12, a second control unit 9 arranged to the rock drilling apparatus 4, and a data communications link 10 between the first control unit 8 and the second control unit 9 for transmitting information between the control units 8, 9. The sensors 11, 12 monitor the operation of the rock drilling apparatus 4 and are connected to transmit

measuring information to the second control unit 9. The second control unit 9 includes a memory unit 9a for storing basic settings for the rock drilling apparatus 4 and a processing unit 9b for calculating parameters describing the operating state of the rock drilling apparatus 4 on the basis of the basic settings and measuring information. The second control unit 9 is arranged to inform the first control unit 8 about external resources that the second control unit 9 needs to perform a required operation. The first control unit 8 is arranged to adjust actuators 19, 25, 27, 30 affecting the operation of the rock drilling apparatus 4 on the basis of the parameters received from the second control unit 9 and instructions given to the first control unit 8.

Independent Claim 10

With respect to claim 10, as described beginning at paragraphs 0013-0019, and illustrated in Figs. 1-3, an exemplary rock drilling rig includes a carrier 1, at least one feeding beam 3, a rock drilling apparatus 4 movable in relation to the feeding beam 3 and having a percussion device 5, one or more sensors 11, 12 arranged to the rock drilling apparatus 4 to measure the operation of the rock drilling apparatus 4, at least one first control unit 8 arranged on the carrier 1 of the rock drilling rig to control the operation of the rock drilling apparatus 4 on the basis of measuring information received from the sensors 11, 12, a second control unit 9 arranged to the rock drilling apparatus 4, and a data communications link 10 between the first control unit 8 and the second control unit 9 for transmitting information between the control units 8, 9. The sensors 11, 12 monitor the operation of the rock drilling apparatus 4 and are connected to transmit measuring information to the second control unit 9. The second control unit 9 includes a memory unit 9a for storing basic settings for the rock drilling apparatus 4 and a processing unit

9b for calculating parameters describing the operating state of the rock drilling apparatus 4 on the basis of the basic settings and measuring information. The first control unit 8 is arranged to control the operation of the rock drilling apparatus 4 on the basis of the parameters received from the second control unit 9 and instructions given to the first control unit 8. The first control unit 8 is arranged to adjust a first valve 19 arranged in a pressure medium channel 21 leading from a pump 29 to the percussion device 5, whereby the first control unit 8 is arranged to control external resources of the drilling apparatus 4.

6. Grounds of Rejection on Appeal

The rejections at issue are as follows:

Claims 1-3, 9 and 10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,934,387 to Tuunanen ("Tuunanen") in view of U.S. Patent No. 5,560,437 to Dickel et al. ("Dickel").

Claims 4 and 6-8 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,699,261 to Muona ("Muona").

Claims 4 and 6-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Tuunanen.

Claim 5 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Tuunanen.

Claims 1, 4 and 6-10 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,343,367 to Mashimo ("Mashimo").

3. Arguments

The Rejection of Claims 1-3, 9 and 10 under 35 U.S.C. § 103(a)

Appellant respectfully submits that claims 1-3, 9 and 10 are allowable over the applied art for at least the following reasons, and that the final rejection of claims 1-3, 9 and 10 under 35 U.S.C. § 103(a) should be reversed.

Claims 1-3

Tuunanen is assigned to the real party in interest in the instant application, *i.e.* Sandvik Tamrock Oy of Finland. Tuunanen is directed to a method for determining the position of a feed beam 3a-3c of a rock drilling equipment so that first, the position of a base 1 of the rock drilling equipment relative to rock is determined in a general system of coordination, and after that, the position of the feed beam 3a-3c relative to the base 1 is measured. *See* Abstract of Tuunanen.

As described at col. 3, ll. 7-66, and illustrated in Fig. 1 of Tuunanen, feed beams 3a-3c are connected to booms 2a to 2c, which in turn are connected to a base 1 of a rock drilling equipment. A rock drill 4a-4c moves on each feed beam in its longitudinal direction, and a drill rod tool 5a -5c is connected to each rock drill.

Measuring devices 6a-6c are attached to the base 1 in a fixed position relative to the base. The measuring devices are connected to a control unit 7 located on the base 1. Further, a separate measuring unit 8 is connected to the control unit 7. The measuring unit 8 can operate in the same way as the fixed measuring devices 6a-6c. Measuring devices 9a-9c and 10a-10c are further mounted in each feed beam 3a-3c. The measuring devices 6a-6c, 8, 9-9c and 10-10c can all be either transmitters, receivers or transmitter-receivers. However, either all the measuring

devices 9a-9c and 10a-10c, or alternatively the fixed measuring devices 6a-6c in the base 1, can be only transmitters and the others receivers, respectively.

The base 1 is driven to a drilling site and its position in the general system of coordination relative to the rock is determined. Then, the position of each feed beam 3a-3c can be determined in the general system of coordination by means of the measuring devices 6a-6c, 8, 9a-9c and 10a-10c, and by means of information indicating the position of the base and converting this mathematically into the position of each feed beam in the general system of coordination. In this regard, the measuring devices 9a-9c and 10a-10c are transmitters that transmit a certain kind of oscillation energy, *i.e.*, a measuring signal. The signals transmitted by the measuring devices of each feed beam 3a-3c are measured separately and the control unit 7 calculates on the basis of their propagation time the distances and directions of each measuring device in the base to a corresponding measuring device.

As described at col. 4, ll. 14-28, if for some reason a measuring device of the feed beam should not be able to transmit reliably, one or more separate measuring units 8 can also be used which is placed in a suitable position under the booms. The position of the measuring unit 8 relative to the base is measured with the fixed measuring devices 6a-6c of the base. The measuring unit 8 can be used for measuring the signals transmitted by the measuring devices 9a-9c and 10a-10c.

It is respectfully submitted that Tuunanen in combination with Dickel fails to teach or suggest Appellant's invention recited in claim 1 for at least the following reasons.

Tuunanen does not disclose anywhere that any measuring device is arranged to the rock drilling apparatus 4a-4c. Thus, Tuunanen does not teach or suggest the features of one or more

sensors arranged to the rock drilling apparatus to measure the operation of the rock drilling apparatus, as recited in claim 1. Because Tuunanen does not show such sensors, Tuunanen can not show at least one first control unit arranged on the carrier of the rock drilling rig to control the operation of the rock drilling apparatus on the basis of measuring information received from the sensors, as recited in claim 1.

Furthermore, Tuunanen does not disclose any second control unit arranged to the rock drilling apparatus 4a-4c. Tuunanen only discloses one single control unit 7 placed on the carrier 1 of the rock drilling rig. In this regard, it is noted that measuring unit 8 is merely a transmitter and/or receiver. Thus, Tuunanen does not teach or suggest the features of a second control unit arranged to the rock drilling apparatus, as recited in claim 1. Because Tuunanen does not show a second control unit, Tuunanen can not show the following features recited in claim 1:

a) a data communications link between the first control unit and the second control unit for transmitting information between the control units;

b) the sensors monitoring the operation of the rock drilling apparatus are connected to transmit measuring information to the second control unit;

c) the second control unit comprises a memory unit for storing basic settings for the rock drilling apparatus and a processing unit for calculating parameters describing the operating state of the rock drilling apparatus on the basis of said basic settings and measuring information, whereby the prevailing operating state of the drilling apparatus is defined in the drilling apparatus; and

d) the first control unit is arranged to control the operation of the rock drilling apparatus on the basis of the parameters received from the second control unit and instructions given to the first control unit.

Appellant respectfully submits that Dickel fails to overcome the above-described deficiencies of Tuunanen. Dickel is directed to a telemetry system for obtaining loggings in a cable-drilled borehole by an independently guided logging probe having a sensor, such that the logging probe is ejected in a drill string and the sensor projects through a drill bit of the drill string. At col. 3, ll. 6-66, and Figs. 1-2 of Dickel, there is described and illustrated a probe 1 in a borehole 12, and a pickup probe 2 in a well string 3 that is in the borehole 12. The probe 1 is conveyed to its logging location in the region of a drill bit 5 by drilling mud. The pickup probe 2 is also driven by the drilling mud along the string 3 until it is in a working position directly behind the logging probe 1. The pickup probe 2 is mounted on a borehole-logging cable 4 that is braked on paying out and tensioned on drawing in by a logging-cable pulley 13. The borehole logging cable 4 is connected to a logging cart 42 in which is mounted a laptop PC 7. The logging probe 1 and pickup probe 2 are connected wirelessly to each other in the working position. The logging probe 1 has a sensor 47 which can reach through a logging aperture in a drill bit 5 for direct mechanical contact with the floor and walls of the borehole 12 in order to collect loggings about the composition of the subsurface and the borehole walls. The logging probe 1 and the pickup probe 2 inter-engaged to form a logging and transmitting unit in a data-transmission position. A wireless data transmission from the laptop PC 7 to the logging probe 1 is facilitated in order to initialize it and to synchronize it with the laptop PC 7. The logging probe 1 is able to receive logging data and store it in data memory 19. The pickup probe 2 can

be pulled by the logging-cable winch 13 out of the borehole 12. The logging data is read as the bore string 3 is pulled out of the borehole 12.

The Office Action relies on logging probe 1 of Dickel for a teaching of a second control unit, as recited in claim 1. Appellant submits that such an assertion is clearly in error. Logging probe 1 merely collects loggings and is in no way a control unit. Moreover, Dickel does not show anywhere one or more sensors arranged to the rock drilling apparatus to measure the operation of the rock drilling apparatus, as recited in claim 1. The sensor 47 of the logging probe 1 merely collects loggings. Therefore, a combination of Tuunanen and Dickel still fails to teach or suggest the combination of features recited in claim 1. MPEP § 2143.03 points out that "[t]o establish prima facie obviousness of a claimed invention, all the claimed limitations must be taught or suggested by the prior art. In re Royka, 409 F.2d 981, 180 USPQ 580 (CCPA 1974)."

Moreover, even if it was determined that Dickel discloses a second control unit and one or more sensors arranged to the rock drilling apparatus to measure the operation of the rock drilling apparatus, Appellant submits that it would not be obvious to combine Tuunanen and Dickel to teach or suggest features recited in claim 1 such as:

a) a data communications link between the first control unit and the second control unit for transmitting information between the control units;

b) the sensors monitoring the operation of the rock drilling apparatus are connected to transmit measuring information to the second control unit;

c) the second control unit comprises a memory unit for storing basic settings for the rock drilling apparatus and a processing unit for calculating parameters describing the operating state of the rock drilling apparatus on the basis of said basic settings and measuring information,

whereby the prevailing operating state of the drilling apparatus is defined in the drilling apparatus; and

d) the first control unit is arranged to control the operation of the rock drilling apparatus on the basis of the parameters received from the second control unit and instructions given to the first control unit.

MPEP § 2141 instructs that "the references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention."

Claims 2 and 3 depend from claim 1 and recite the same combination of allowable features recited in independent claim 1, as well as additional features that define over the applied reference.

Claim 9

At least for the above-described reasons with respect to claim 1, Appellant respectfully submits that a combination of Tuunanen and Dickel fails to teach or suggest the combination of features recited in claim 9, including:

a) one or more sensors arranged to the rock drilling apparatus to measure an operation of the rock drilling apparatus;

b) at least one first control unit arranged on the carrier of the rock drilling rig to control the operation of the rock drilling apparatus on the basis of measuring information received from the sensors;

c) a second control unit arranged to the rock drilling apparatus;

d) a data communications link between the first control unit and the second control unit for transmitting information between the control units;

e) the sensors monitoring the operation of the rock drilling apparatus are connected to transmit measuring information to the second control unit; and

f) the second control unit comprises a memory unit for storing basic settings for the rock drilling apparatus and a processing unit for calculating parameters describing an operating state of the rock drilling apparatus on the basis of said basic settings and measuring information.

Moreover, a combination of Tuunanen and Dickel fails to teach or suggest the second control unit is arranged to inform the first control unit about external resources that the second control unit needs to perform a required operation, and the first control unit is arranged to adjust actuators affecting the operation of the rock drilling apparatus on the basis of the parameters received from the second control unit and instructions given to the first control unit, as recited in claim 9. MPEP § 2143.03 points out that "[t]o establish prima facie obviousness of a claimed invention, all the claimed limitations must be taught or suggested by the prior art. In re Royka, 409 F.2d 981, 180 USPQ 580 (CCPA 1974)."

Claim 10

At least for the above-described reasons with respect to claim 1, Appellant respectfully submits that a combination of Tuunanen and Dickel fails to teach or suggest the combination of features recited in claim 10, including:

a) one or more sensors arranged to the rock drilling apparatus to measure an operation of the rock drilling apparatus;

b) at least one first control unit arranged on the carrier of the rock drilling rig to control the operation of the rock drilling apparatus on the basis of measuring information received from the sensors;

c) a second control unit arranged to the rock drilling apparatus;

d) a data communications link between the first control unit and the second control unit for transmitting information between the control units;

e) the sensors monitoring the operation of the rock drilling apparatus are connected to transmit measuring information to the second control unit;

f) the second control unit comprises a memory unit for storing basic settings for the rock drilling apparatus and a processing unit for calculating parameters describing an operating state of the rock drilling apparatus on the basis of said basic settings and measuring information; and

g) the first control unit is arranged to control the operation of the rock drilling apparatus on the basis of the parameters received from the second control unit and instructions given to the first control unit.

Moreover, a combination of Tuunanen and Dickel fails to teach or suggest the first control unit is arranged to adjust a first valve arranged in a pressure medium channel leading from a pump to the percussion device, whereby the first control unit is arranged to control external resources of the drilling apparatus, as recited in claim 10. MPEP § 2143.03 points out that "[t]o establish prima facie obviousness of a claimed invention, all the claimed limitations must be taught or suggested by the prior art. In re Royka, 409 F.2d 981, 180 USPQ 580 (CCPA 1974)."

The Rejection of Claims 4 and 6-8 under 35 U.S.C. § 102(b) by Muona

Appellant respectfully submits that claims 4, and 6-8 are allowable over the applied art for at least the following reasons, and that the rejection of claims 4 and 6-8 under 35 U.S.C. § 102(b) should be reversed.

Claims 4 and 7-8

Muona is assigned to the real party in interest in the instant application, *i.e.* Sandvik Tamrock Oy of Finland. Muona is directed to a control system in rock drilling equipment. A control unit includes an electronic basic set-value memory storing set values for operating parameters of different operating means, and a separate electronic operator set-value memory in which the operator can store set values he wants to give to the operating parameters of the different operating means. As described at col. 2, line 34 – col. 3, line 49, and illustrated in the Figure, the control arrangement of Muona includes an electronic control unit 1, a keyboard 2, a basic set-value memory 3, and an operator set-value memory 4 for storing the set values desired by the operator. The control unit 1 controls operating means 6 through an operation unit 5. The operating means 6 collectively refers to various drives, such as a hydraulic cylinder, a rotation motor for a rock drill, a percussion machinery, a feed motor or other drive device associated with the operation of the boom or the rock drill.

When the equipment is being manufactured, the manufacturer programs the basic set-value memory 3 of the control unit 1 so that when the control unit is used, it obtains the control and operating parameters of the different operating means from the basic set-value memory 3. When the operator, that is, the driller, wants to alter the set values, he may feed them by the keyboard 2 into the operator set-value memory 4. Values that have not been altered by the

operator are thus obtained from the basic set-value memory 3, and values that have been altered are obtained from the operator set-value memory 4.

A diagnosing unit 7 compares the control values inputted by the operator by a control member 8, such as a joystick, with the actual values of the control values applied from the control unit 1 to the operating means 6. The diagnosing unit 7 is connected to monitor the control value applied by the control member 8 to a control line 9 and the adjustment value applied by the control unit 1 or the operation unit 5 to an adjustment line 10 for the operating means. The diagnosing unit monitors these values and indicates the operation by a separate indicating element 11. Diagnosing can be done in such a manner that the control value of the control member 8 is merely compared with the adjustment value applied from the control unit 1 or the operation unit 5 to the operating means. If the values differ from each other by more than a predetermined maximum difference value, the indicating element 11 can indicate the difference. It is thus easy to detect whether there is a failure in the equipment.

It is respectfully submitted that Muona fails to teach Appellant's invention recited in claim 4 for at least the following reasons.

Muona does not disclose one or more sensors arranged to measure the operation of the rock breaking machine, and the sensors are arranged to transmit measuring information to the control unit, as recited in claim 4. Diagnosing unit 7 monitors the control value applied to control line 9 and the adjustment value applied to an adjustment line 10. Diagnosing unit 7 does not measure the operation of operation means 6. Moreover, diagnosing unit 7 does not transmit measuring information to control unit 1 or operation unit 5. Also, Muona does not teach the control unit comprises a connection to a data communications link that enables communication

between the control unit and at least one control unit external to the rock breaking machine, as recited in claim 4. Therefore, Muona fails to teach the combination of features recited in claim 4. As pointed out in MPEP § 2131, "[t]o anticipate a claim, the reference must teach every element of the claim." Thus, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. Verdegaal Bros. v. Union Oil Co. Of California, 2 USPQ 2d 1051, 1053 (Fed. Cir. 1987)."

At least for the reasons described above with respect to claim 4, Appellant respectfully submits that Muona fails to teach the combination of features recited in claim 7, including:

a) one or more sensors arranged to measure an operation of the rock drilling apparatus;

b) the sensors are arranged to transmit measuring information to the control unit; and

c) the control unit comprises a connection to a data communications link that enables communication between the control unit and at least one control unit external to the rock drilling apparatus.

At least for the reasons described above with respect to claim 4, Appellant respectfully submits that Muona fails to teach the combination of features recited in claim 8, including:

a) one or more sensors arranged to measure an operation of the rock breaking hammer;

b) the sensors are arranged to transmit measuring information to the control unit; and

c) the control unit comprises a connection to a data communications link that enables communication between the control unit and at least one control unit external to the rock breaking hammer.

Claim 6

At least for the reasons described above with respect to claim 4, Appellant respectfully submits that Muona fails to teach the combination of features recited in claim 6, including:

a) one or more sensors arranged to measure an operation of the rock breaking machine;

b) the sensors are arranged to transmit measuring information to the control unit; and

c) the control unit comprises a connection to a data communications link that enables communication between the control unit and at least one control unit external to the rock breaking machine.

Moreover, Muona does not teach a control unit arranged inside the body of the rock breaking machine, as recited in claim 6. As pointed out in MPEP § 2131, "[t]o anticipate a claim, the reference must teach every element of the claim." Thus, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. Verdegaal Bros. v. Union Oil Co. Of California, 2 USPQ 2d 1051, 1053 (Fed. Cir. 1987)."

The Rejection of Claims 4 and 6-8 under 35 U.S.C. § 102(b) by Tuunanen

Appellant respectfully submits that claims 4 and 6-8 are allowable over the applied art for at least the following reasons, and that the rejection of claims 4 and 6-8 under 35 U.S.C. § 102(b) should be reversed.

Claims 4 and 7-8

It is respectfully submitted that Tuunanen fails to teach Appellant's invention recited in claim 4 for at least the following reasons.

Tuunanen does not disclose one or more sensors arranged to measure the operation of the rock breaking machine, as recited in claim 4. Measuring devices 6a-6c, 8, 9a-9c and 10a-10c of Tuunanen determine the position of each feed beam 3a-3c in a general system of coordination.

Tuunanen does not disclose a control unit including a memory unit for storing basic settings for the rock breaking machine and further a processing unit that is, during operation, arranged to form parameters describing the operating state of the rock breaking machine on the basis of the basic settings and measuring information, as recited in claim 4. In Tuunanen, the signals transmitted by the measuring devices of each feed beam 3a-3c are measured separately and the control unit 7 calculates on the basis of their propagation time the distances and directions of each measuring device.

Tuunanen does not disclose the control unit includes a connection to a data communications link that enables communication between the control unit and at least one control unit external to the rock breaking machine for controlling the operation of the rock breaking machine so as to achieve the desired operating state of the rock breaking machine, as recited in claim 4. Tuunanen discloses only one control unit 7.

Therefore, Tuunanen fails to teach the combination of features recited in claim 4. As pointed out in MPEP § 2131, "[t]o anticipate a claim, the reference must teach every element of the claim." Thus, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. Verdegaal Bros. v. Union Oil Co. Of California, 2 USPQ 2d 1051, 1053 (Fed. Cir. 1987)."

At least for the reasons described above with respect to claim 4, Appellant respectfully submits that Tuunanen fails to teach the combination of features recited in claim 7, including:

a) one or more sensors arranged to measure an operation of the rock drilling apparatus;

b) a control unit including a memory unit for storing basic settings for the rock drilling apparatus and further a processing unit that is, during operation, arranged to form parameters describing an operating state of the rock drilling apparatus on the basis of basic settings and measuring information; and

c) the control unit includes a connection to a data communications link that enables communication between the control unit and at least one control unit external to the rock drilling apparatus for controlling the operation of the rock drilling apparatus so as to achieve the desired operating state of the rock drilling apparatus.

At least for the reasons described above with respect to claim 4, Appellant respectfully submits that Tuunanen fails to teach the combination of features recited in claim 8, including:

a) one or more sensors arranged to measure an operation of the rock breaking hammer;

b) a control unit including a memory unit for storing basic settings for the rock breaking hammer and further a processing unit that is, during operation, arranged to form parameters describing an operating state of the rock breaking hammer on the basis of basic settings and measuring information; and

c) the control unit includes a connection to a data communications link that enables communication between the control unit and at least one control unit external to the rock breaking hammer for controlling the operation of the rock breaking hammer so as to achieve the desired operating state of the rock breaking hammer.

Claim 6

At least for the reasons described above with respect to claim 4, Appellant respectfully submits that Tuunanen fails to teach the combination of features recited in claim 6, including:

a) one or more sensors arranged to measure an operation of the rock breaking machine;

b) a control unit including a memory unit for storing basic settings for the rock breaking machine and further a processing unit that is, during operation, arranged to form parameters describing an operating state of the rock breaking machine on the basis of basic settings and measuring information; and

c) the control unit includes a connection to a data communications link that enables communication between the control unit and at least one control unit external to the rock breaking machine for controlling the operation of the rock breaking machine so as to achieve the desired operating state of the rock breaking machine.

Moreover, Tuunanen does not teach a control unit arranged inside the body of the rock breaking machine, as recited in claim 6. As pointed out in MPEP § 2131, "[t]o anticipate a claim, the reference must teach every element of the claim." Thus, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. Verdegaal Bros. v. Union Oil Co. Of California, 2 USPQ 2d 1051, 1053 (Fed. Cir. 1987)."

The Rejection of Claim 5 under 35 U.S.C. § 103(a) by Tuunanen

Appellant respectfully submits that claim 5 is allowable over the applied art for at least the following reasons, and that the rejection of claim 5 under 35 U.S.C. § 103(a) should be reversed.

Claim 5

Claim 5 depends from claim 1 and recites the same combination of allowable features recited in independent claim 1, as well as additional features that define over the applied reference. For example, claim 5 recites the control unit is arranged inside the body of the rock breaking machine and at least some of the sensors are part of the control unit. The Office Action asserts that it would have been obvious to locate the control unit 7 inside the body of the rock drill 4a to provide additional protection of the control unit from the environment, since rearranging of parts of an invention involves only routine skill in the art. However, the rock drill 4a is exposed to vibrations, heat, blows, moisture, dirt, etc. Therefore it would not be obvious to place the control unit 7 in the rock drill 4a. When placed on the base 1, as taught by Tuunanen, the control unit 7 is better protected.

In any event, Tuunanen fails to teach or suggest the combination of features recited in claim 4, from which claim 5 depends. MPEP § 2143.03 points out that "[t]o establish prima facie obviousness of a claimed invention, all the claimed limitations must be taught or suggested by the prior art. In re Royka, 409 F.2d 981, 180 USPQ 580 (CCPA 1974)."

The Rejection of Claims 1, 4 and 6-10 under 35 U.S.C. § 102(b) by Mashimo

Appellant respectfully submits that claims 1, 4 and 6-10 are allowable over the applied art for at least the following reasons, and that the rejection of claims 1, 4 and 6-10 under 35 U.S.C. § 102(b) should be reversed.

Claims 1, 4, 7 and 8

Mashimo is directed to a positioning arrangement for a drilling machine in which a desired position of a bit of the drilling machine mounted on a boom structure is indicated based on rectangular coordinates, for facilitation of automatic positioning programming of the boom structure. *See* Abstract of Mashimo. At col. 1, ll. 26-33, Mashimo describes that conventional arrangements have a serious disadvantage in that, since the movement of the boom structure is based on spherical coordinates, rather than rectangular coordinates which are well suited to human senses, it has been extremely difficult to designate proper positions of such a boom structure in an efficient manner. As described at col. 1, line 67 – col. 2, line 8, it is an object of Mashimo to provide a positioning arrangement in which, by indicating the desired position of the drilling machine bit mounted on the boom structure in terms of rectangular coordinates, the automatic positioning program for the boom structure is facilitated, with the position of the particular boom end being designated by numerical values in terms of rectangular coordinates.

At col. 3, ll. 13-34 and Fig. 1, there is described and illustrated a drilling machine and boom construction D to which the boom positioning arrangement according to the alleged invention of Mashimo may be applied. The drilling machine and boom construction D includes a first boom 2 pivotally connected on a base F secured to a vehicle, a second boom 3 pivotally connected to the first boom 2, and a hydraulic cylinder 5 for a guide cell 7 secured to the second boom 3. The guide cell 7 has a feed motor 6 attached at its rear end and is slidably mounted on the hydraulic cylinder 5 for reciprocation of the guide cell 7 by actuation of the hydraulic cylinder 5. A drilling machine 8 having a bit 10 attached to one end of a rod 9 is reciprocatingly mounted on the guide cell 7 for advancing and retracting movement of the drilling machine 8 during a drilling operation.

Col. 3, line 55 – col. 4, line 58, and Figs. 3-4, describe and illustrate fundamental equations of motion relating the rectangular coordinates of a distal end of the guide cell 7 to the so-called movable coordinates of the distal end of the guide cell 7 (i.e. spherical coordinates). The relationship is established through rectangular coordinate matrix Q_A and movable coordinate matrix Q_B. At col. 4, ll. 53-65, Mashimo alleges to provide a coordinate converter $\{Q_A \rightarrow Q_B\}$, and a positioning servo control unit for angular movement of first boom 2 and second boom 3 via hydraulic cylinders 11-14, so that controlling the position and direction of the guide cell 7 in the rectangular coordinate system can be achieved.

As described at col. 9, ll. 23-55, and illustrated in Fig. 5, the coordinate values of the position and direction of the drill at points in the drilling pattern of the drilling machine 8 in a predetermined rectangular coordinate system are first stored in a memory means 15. Subsequently, when the operation input is applied to the central processing unit 18, the

information for the values for the desired drilling point in the rectangular coordinate system enter a converter 17 for conversion from Q_A to Q_B and the position in the boom coordinates are stored in a register 19. According to an instruction therefrom, the hydraulic cylinders 5 and 11-14 are actuated to extend the piston rods thereof by a boom positioning servo control unit 16 for bringing the distal end of the guide cell to the desired position. Upon completion of the positioning, the drilling machine 8 carries out a drilling operation under the control of a drilling machine control unit 22. When the drilling operation is completed, a termination signal is supplied to a central processing unit 18, which then obtains values for a new position from the memory means 15 to be applied to the converter 17. The positioning of the guide cell 7 and the drilling operation are carried out in the order as described above, and with the procedure being sequentially repeated, until the drilling operation is terminated after completion of a particular pattern.

It is respectfully submitted that Mashimo fails to teach Appellant's invention recited in claim 1 for at least the following reasons. Mashimo is directed to a system for controlling a boom by conversion of the boom's spatial location between rectangular coordinates and spherical coordinates. Mashimo discloses only one controller for drilling machine 8, i.e. drilling machine control unit 22, and is silent as to particular details of controlling drilling machine 8. As such, Mashimo does not teach at least the following combination of features recited in claim 1.

a) one or more sensors arranged to the rock drilling apparatus to measure an operation of the rock drilling apparatus;

b) at least one first control unit arranged on the carrier of the rock drilling rig to control the operation of the rock drilling apparatus on the basis of measuring information received from the sensors;

c) a second control unit arranged to the rock drilling apparatus;

d) a data communications link between the first control unit and the second control unit for transmitting information between the control units;

e) the sensors monitoring the operation of the rock drilling apparatus are connected to transmit measuring information to the second control unit;

f) the second control unit comprises a memory unit for storing basic settings for the rock drilling apparatus and a processing unit for calculating parameters describing an operating state of the rock drilling apparatus on the basis of said basic settings and measuring information, whereby the prevailing operating state of the drilling apparatus is defined in the drilling apparatus, and

g) the first control unit is arranged to control the operation of the rock drilling apparatus on the basis of the parameters received from the second control unit and instructions given to the first control unit.

As pointed out in MPEP § 2131, "[t]o anticipate a claim, the reference must teach every element of the claim." Thus, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. Verdegaal Bros. v. Union Oil Co. Of California, 2 USPQ 2d 1051, 1053 (Fed. Cir. 1987)."

At least for the reasons described above with respect to claim 1, Appellant respectfully submits that Mashimo fails to teach the combination of features recited in claim 4, including:

a) one or more sensors arranged to measure an operation of the rock breaking machine;

b) said sensors are arranged to transmit measuring information to the control unit;

c) the control unit comprises a memory unit for storing basic settings for the rock breaking machine and further a processing unit that is, during operation, arranged to form parameters describing an operating state of the rock breaking machine on the basis of the basic settings and measuring information; and

d) the control unit comprises a connection to a data communications link that enables communication between the control unit and at least one control unit external to the rock breaking machine for controlling the operation of the rock breaking machine so as to achieve the desired operating state of the rock breaking machine.

At least for the reasons described above with respect to claim 1, Appellant respectfully submits that Mashimo fails to teach the combination of features recited in claim 7, including:

a) one or more sensors arranged to measure an operation of the rock drilling apparatus;

b) said sensors are arranged to transmit measuring information to the control unit;

c) the control unit comprises a memory unit for storing basic settings for the rock drilling apparatus and further a processing unit that is, during operation, arranged to form parameters describing an operating state of the rock drilling apparatus on the basis of basic settings and measuring information; and

d) the control unit comprises a connection to a data communications link that enables communication between the control unit and at least one control unit external to the rock drilling apparatus for controlling the operation of the rock drilling apparatus so as to achieve the desired operating state of the rock drilling apparatus.

At least for the reasons described above with respect to claim 1, Appellant respectfully submits that Mashimo fails to teach the combination of features recited in claim 8, including:

a) one or more sensors arranged to measure an operation of the rock breaking hammer;

b) said sensors are arranged to transmit measuring information to the control unit;

c) the control unit comprises a memory unit for storing basic settings for the rock breaking hammer and further a processing unit that is, during operation, arranged to form parameters describing an operating state of the rock breaking hammer on the basis of the basic settings and measuring information; and

d) the control unit comprises a connection to a data communications link that enables communication between the control unit and at least one control unit external to the rock breaking hammer for controlling the operation of the rock breaking hammer so as to achieve the desired operating state of the rock breaking hammer.

Claim 6

At least for the reasons described above with respect to claim 1, Appellant respectfully submits that Mashimo fails to teach the combination of features recited in claim 6, including:

a) one or more sensors arranged to measure an operation of the rock breaking machine;

b) said sensors are arranged to transmit measuring information to the control unit;

c) the control unit comprises a memory unit for storing basic settings for the rock breaking machine and further a processing unit that is, during operation, arranged to form parameters describing an operating state of the rock breaking machine on the basis of the basic settings and measuring information; and

d) the control unit comprises a connection to a data communications link that enables communication between the control unit and at least one control unit external to the rock breaking machine for controlling the operation of the rock breaking machine so as to achieve the desired operating state of the rock breaking machine.

Moreover, Mashimo does not teach a control unit arranged inside the body of the rock breaking machine, as recited in claim 6. As pointed out in MPEP § 2131, "[t]o anticipate a claim, the reference must teach every element of the claim." Thus, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. Verdegaal Bros. v. Union Oil Co. Of California, 2 USPQ 2d 1051, 1053 (Fed. Cir. 1987)."

Claim 9

At least for the reasons described above with respect to claim 1, Appellant respectfully submits that Mashimo fails to teach the combination of features recited in claim 9, including:

a) one or more sensors arranged to the rock drilling apparatus to measure an operation of the rock drilling apparatus;

b) at least one first control unit arranged on the carrier of the rock drilling rig to control the operation of the rock drilling apparatus on the basis of measuring information received from the sensors;

c) a second control unit arranged to the rock drilling apparatus;

d) a data communications link between the first control unit and the second control unit for transmitting information between the control units;

e) the sensors monitoring the operation of the rock drilling apparatus are connected to transmit measuring information to the second control unit; and

f) the second control unit comprises a memory unit for storing basic settings for the rock drilling apparatus and a processing unit for calculating parameters describing an operating state of the rock drilling apparatus on the basis of said basic settings and measuring information.

Moreover, Mashimo does not teach the second control unit is arranged to inform the first control unit about external resources that the second control unit needs to perform a required operation, and the first control unit is arranged to adjust actuators affecting the operation of the rock drilling apparatus on the basis of the parameters received from the second control unit and instructions given to the first control unit, as recited in claim 9. As pointed out in MPEP § 2131, "[t]o anticipate a claim, the reference must teach every element of the claim." Thus, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. Verdegaal Bros. v. Union Oil Co. Of California, 2 USPQ 2d 1051, 1053 (Fed. Cir. 1987)."

Claim 10

At least for the reasons described above with respect to claim 1, Appellant respectfully submits that Mashimo fails to teach the combination of features recited in claim 10, including:

a) one or more sensors arranged to the rock drilling apparatus to measure an operation of the rock drilling apparatus;

b) at least one first control unit arranged on the carrier of the rock drilling rig to control the operation of the rock drilling apparatus on the basis of measuring information received from the sensors;

c) a second control unit arranged to the rock drilling apparatus;

d) a data communications link between the first control unit and the second control unit for transmitting information between the control units;

e) the sensors monitoring the operation of the rock drilling apparatus are connected to transmit measuring information to the second control unit;

f) the second control unit comprises a memory unit for storing basic settings for the rock drilling apparatus and a processing unit for calculating parameters describing an operating state of the rock drilling apparatus on the basis of said basic settings and measuring information, and

g) the first control unit is arranged to control the operation of the rock drilling apparatus on the basis of the parameters received from the second control unit and instructions given to the first control unit.

Moreover, Mashimo does not teach the first control unit is arranged to adjust a first valve arranged in a pressure medium channel leading from a pump to the percussion device, whereby

the first control unit is arranged to control external resources of the drilling apparatus, as recited in claim 10. As pointed out in MPEP § 2131, "[t]o anticipate a claim, the reference must teach every element of the claim." Thus, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. Verdegaal Bros. v. Union Oil Co. Of California, 2 USPQ 2d 1051, 1053 (Fed. Cir. 1987)."

At least for the above-described reasons, Appellant respectfully asserts that the rejection of claims 1-3, 9 and 10 under 35 U.S.C. § 103(a), the rejections of claims 4 and 6-8 under 35 U.S.C. § 102(b), the rejection of claim 5 under 35 U.S.C. § 103(a), and the rejection of claims 1, 4 and 6-10 under 35 U.S.C. § 102(b), should be reversed in whole.

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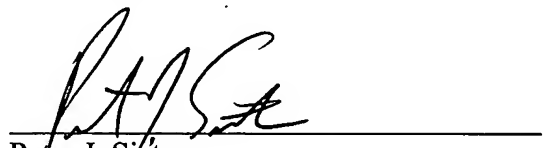
In view of the foregoing, Appellant respectfully requests the reversal of the Examiner's rejections and allowance of the pending claims. If there are any other fees due in connection with the filing of this Appeal Brief, please charge the fees to our Deposit Account No. 50-0573. If a fee is required for an extension of time under 37 C.F.R. § 1.136 not accounted for above, such an extension is requested and the fee should also be charged to our Deposit Account No. 50-0573.

Respectfully submitted,

DRINKER BIDDLE & REATH LLP

Dated: January 30, 2007

By: 

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8. Appendix A- Claims

Claim 1 (Previously Presented): A rock drilling rig comprising:

a carrier,

at least one feeding beam,

a rock drilling apparatus movable in relation to the feeding beam and having a percussion device,

one or more sensors arranged to the rock drilling apparatus to measure an operation of the rock drilling apparatus,

at least one first control unit arranged on the carrier of the rock drilling rig to control the operation of the rock drilling apparatus on the basis of measuring information received from the sensors,

a second control unit arranged to the rock drilling apparatus,

a data communications link between the first control unit and the second control unit for transmitting information between the control units,

the sensors monitoring the operation of the rock drilling apparatus are connected to transmit measuring information to the second control unit,

the second control unit comprises a memory unit for storing basic settings for the rock drilling apparatus and a processing unit for calculating parameters describing an operating state of the rock drilling apparatus on the basis of said basic settings and measuring information, whereby the prevailing operating state of the drilling apparatus is defined in the drilling apparatus, and

the first control unit is arranged to control the operation of the rock drilling apparatus on the basis of the parameters received from the second control unit and instructions given to the first control unit.

Claim 2 (Previously Presented): A rock drilling rig as claimed in claim 1, wherein the second control unit is arranged inside the body of the rock drilling apparatus and at least some of the sensors and the second control unit form together a compact entity.

Claim 3 (Original): A rock drilling rig as claimed in claim 1, wherein the first data communications link between the first control unit and the second control unit is a CAN bus.

Claim 4 (Previously Presented): A rock breaking machine comprising:

a body,

a percussion device arranged inside the body to generate impact pulses to a tool connectable to the rock breaking machine,

one or more sensors arranged to measure an operation of the rock breaking machine,

a control unit,

said sensors are arranged to transmit measuring information to the control unit,

the control unit comprises a memory unit for storing basic settings for the rock breaking machine and further a processing unit that is, during operation, arranged to form parameters

describing an operating state of the rock breaking machine on the basis of the basic settings and measuring information, and

the control unit comprises a connection to a data communications link that enables communication between the control unit and at least one control unit external to the rock breaking machine for controlling the operation of the rock breaking machine so as to achieve the desired operating state of the rock breaking machine.

Claim 5 (Previously Presented): A rock breaking machine as claimed in claim 4, wherein the control unit is arranged inside the body of the rock breaking machine and at least some of the sensors are part of the control unit.

Claim 6 (Previously Presented): A rock breaking machine comprising:

a body,

a percussion device arranged inside the body to generate impact pulses to a tool connectable to the rock breaking machine,

one or more sensors arranged to measure an operation of the rock breaking machine,

a control unit arranged inside the body of the rock breaking machine,

said sensors are arranged to transmit measuring information to the control unit,

the control unit comprises a memory unit for storing basic settings for the rock breaking machine and further a processing unit that is, during operation, arranged to form parameters describing an operating state of the rock breaking machine on the basis of the basic settings and measuring information, and

the control unit comprises a connection to a data communications link that enables communication between the control unit and at least one control unit external to the rock breaking machine for controlling the operation of the rock breaking machine so as to achieve the desired operating state of the rock breaking machine.

Claim 7 (Previously Presented): A rock drilling apparatus arranged movable in relation to a feeding beam and comprising:

a body,

a percussion device arranged inside the body to generate impact pulses to a tool connectable to the rock drilling apparatus,

one or more sensors arranged to measure an operation of the rock drilling apparatus,

a control unit,

said sensors are arranged to transmit measuring information to the control unit,

the control unit comprises a memory unit for storing basic settings for the rock drilling apparatus and further a processing unit that is, during operation, arranged to form parameters describing an operating state of the rock drilling apparatus on the basis of basic settings and measuring information, and

the control unit comprises a connection to a data communications link that enables communication between the control unit and at least one control unit external to the rock drilling apparatus for controlling the operation of the rock drilling apparatus so as to achieve the desired operating state of the rock drilling apparatus.

Claim 8 (Previously Presented): A rock breaking hammer comprising:

a body,

a percussion device arranged inside the body to generate impact pulses to a tool connectable to the rock breaking hammer,

one or more sensors arranged to measure an operation of the rock breaking hammer,

a control unit,

said sensors are arranged to transmit measuring information to the control unit,

the control unit comprises a memory unit for storing basic settings for the rock breaking hammer and further a processing unit that is, during operation, arranged to form parameters describing an operating state of the rock breaking hammer on the basis of the basic settings and measuring information, and

the control unit comprises a connection to a data communications link that enables communication between the control unit and at least one control unit external to the rock breaking hammer for controlling the operation of the rock breaking hammer so as to achieve the desired operating state of the rock breaking hammer.

Claim 9 (Previously Presented): A rock drilling rig comprising:

a carrier,

at least one feeding beam,

a rock drilling apparatus movable in relation to the feeding beam and having a percussion device,

one or more sensors arranged to the rock drilling apparatus to measure an operation of the rock drilling apparatus,

at least one first control unit arranged on the carrier of the rock drilling rig to control the operation of the rock drilling apparatus on the basis of measuring information received from the sensors,

a second control unit arranged to the rock drilling apparatus,

a data communications link between the first control unit and the second control unit for transmitting information between the control units,

the sensors monitoring the operation of the rock drilling apparatus are connected to transmit measuring information to the second control unit,

the second control unit comprises a memory unit for storing basic settings for the rock drilling apparatus and a processing unit for calculating parameters describing an operating state of the rock drilling apparatus on the basis of said basic settings and measuring information, the second control unit is arranged to inform the first control unit about external resources that the second control unit needs to perform a required operation, and

the first control unit is arranged to adjust actuators affecting the operation of the rock drilling apparatus on the basis of the parameters received from the second control unit and instructions given to the first control unit.

Claim 10 (Previously Presented): A rock drilling rig comprising:

a carrier,

at least one feeding beam,

a rock drilling apparatus movable in relation to the feeding beam and having a percussion device,

one or more sensors arranged to the rock drilling apparatus to measure an operation of the rock drilling apparatus,

at least one first control unit arranged on the carrier of the rock drilling rig to control the operation of the rock drilling apparatus on the basis of measuring information received from the sensors,

a second control unit arranged to the rock drilling apparatus,

a data communications link between the first control unit and the second control unit for transmitting information between the control units,

the sensors monitoring the operation of the rock drilling apparatus are connected to transmit measuring information to the second control unit,

the second control unit comprises a memory unit for storing basic settings for the rock drilling apparatus and a processing unit for calculating parameters describing an operating state of the rock drilling apparatus on the basis of said basic settings and measuring information, and

the first control unit is arranged to control the operation of the rock drilling apparatus on the basis of the parameters received from the second control unit and instructions given to the first control unit, and

the first control unit is arranged to adjust a first valve arranged in a pressure medium channel leading from a pump to the percussion device, whereby the first control unit is arranged to control external resources of the drilling apparatus.

9. Appendix B- Evidence

No information is appended under this section.

10. Appendix C- Related Proceedings

No information is appended under this section.